Remarks

Claims 1 – 10 are pending in this action. Claims 1 – 10 stand rejected. Based on the following remarks, Applicants respectfully request reconsideration of all pending claims herein.

Applicants respectfully request to obtain clarification on Examiner's Office Action Summary regarding Priority under 35 U.S.C. 119 item 12 stating that none of the certified copies of the priority documents have been received. Applicants mailed a certified copy of Foreign Application, Japanese Application JP2003-038532, July 15, 2004 to the USPTO. Applicants' received a return receipt postcard on July 23, 2005 with an OIPE date stamp of July 19, 2004 indicating that the certified copy of the foreign application was received by the USPTO.

Claim Rejections – 35 U.S.C. § 102 (b)

The Examiner has rejected claims 9 and 10 under 35 U.S.C. 102(b) as being anticipated by Hamada (U.S. Patent No. 6,906,282).

The Examiner states that Hamada discloses a hole drilling apparatus that includes a laser for drilling holes though a mask into a work piece, which is further attached to a movable stage. The mask has a processing pattern made from a plurality of holes. An imaging lens controls the direction of the laser on the work piece surface and ratios of the imaging lens determine the diameter of the holes.

Applicants submit that Hamada's apparatus uses a mask with a predetermined pattern to determine the location of the holes to be drilled on the work piece, i.e. the mask is used directly as a template (see Hamada; Col 1 Lines 39 – 40, Fig. 1 – 3, Claims 1 and 3). The location of holes on the work piece described in Applicants' invention is not controlled nor determined by a mask (see Maeda; Paragraph 31, Fig. 2). Applicants' invention has several other means for positioning holes on the work piece. In one embodiment, Applicants' invention moves the galvano mirrors (GM) such that the laser is incident on an area of the lens, resulting in the laser hitting the work piece in

a different location (see Maeda paragraphs 34, Figs. 3A and 3B, and Claim 10). In yet another embodiment, the lens is moved incident to the work piece such that the laser hits the work piece in a different location (see Maeda paragraph 48 and Fig. 7). Applicants have added a new Claim, Claim 11, to further clarify that the location of holes on the substrate is not determined using a mask.

Hamada discloses an apparatus wherein the diameter of the holes is adjusted by changing the reduction ratio of the imaging lens between the mask template and the work piece (see Hamada; Col 1 Lines 42 – 45, Fig. 1). In Applicant's invention, the diameter of the holes is adjusted by changing the diameter of the laser, which is accomplished by changing the diameter of the mask 15 and collimator lenses (CL) through which the laser passes (see Maeda; Paragraph 31, Fig. 2, and Claim 9). Applicants' mask 15 does not have a processing pattern including a plurality of holes as suggested by Hamada.

Applicants submit that the arguments described above and the addition of Claim 11 overcome the Examiner's rejections to Claims 9 and 10, and that Applicants' invention is patentably distinguished from the references cited by the Examiner. Accordingly, Applicants respectfully submit that the rejection of claims 9 and 10 under 35 U.S.C. § 102(b) has been overcome and claims 9 and 10 are in condition for allowance.

Claim Rejections - 35 U.S.C. § 103(a)

The Examiner rejected claims 1 - 8 under 35 U.S.C. § 103(a), as being unpatentable over U.S. Patent No. 6,649,864 issued to De Steur et al. in view of U.S. Patent No. 4,822,974 issued to Leighton.

The Examiner stated that De Steur discloses a laser drilling method in which a perforated

mask is used to drill a hole with a predetermined diameter. The Examiner stated that Leighton discloses a laser drilling apparatus wherein the laser angle incident on the work piece is determined by the position of two prisms through which the laser travels. The Examiner stated that it would have been obvious to one skilled in the art to determine the angle of the beam relative to the axis as taught by Leighton in the De Steur process.

Applicants submit that De Steur teaches away from having angles incident to the work piece because the De Steur process uses beams of various diameters applied to the work piece wherein the beam is moved in a circular motion to "circle punch" the hole (See De Steur Col. 3 Line 45 – Col. 4 Line 10, Figures 3 -4). De Steur teaches using a smaller diameter laser having a more focused energy and moving the smaller beam within the perforated mask template in complete concentric circles until the entire circular area of the hole corresponding to the mask has been removed and the result is a cylindrical hole (see De Steur: Abstract, Summary of the invention, Figures, Independent Claims 1, 3, 16 – 18). Therefore, De Steur teaches a laser that is pulsed in a circular motion through a perforated mask wherein one skilled in the art can deduce that the laser *must* be perpendicular to the work piece in order to create a rectangular hole because any angle incident on the work piece would create a conical or bi-conical hole.

Applicants submit that Leighton discloses a method and apparatus for drilling cylindrical, conical and bi-conical holes. Leighton teaches use of a laser beam that is perpendicular to the work piece, while rotating the prisms as a unit to cut a cylindrical hole (see Leighton; Fig. 3, Col. 3 Lines 38 – 50, Claim 4) much like a conventional hole saw used in drilling holes in wood.

Since neither De Steur nor Leighton teach or suggest the use of an angled beam to produce a cylindrical hole, it would not have been obvious to one of ordinary skill in the art at the time of the invention to *angle* the beam incident to the work piece to form a *cylindrical* hole. Therefore, Applicants have clarified Claims 1, 3, and 6 to more clearly identify the invention as producing substantially equal diameters (e.g. cylindrical) throughout a drilled hole.

Applicants submit that the arguments described above and amendments to Claims 1, 3, and

6 overcome the Examiner's rejections and that Applicants' invention is patentably distinguished from the references cited by the Examiner. Accordingly, Applicants respectfully submit that the rejection of claims 1 – 8 under 35 U.S.C. § 103(a) has been overcome and claims 1-8 are in condition for allowance.

Prior Art Made of Record

The prior art made of record by the Examiner and not relied upon, i.e. U.S. Patent No. 3,440,388 by Meeks et al., U.S. Patent No. 3,562,009 by Cranston et al., and U.S. Patent No. 5,145,551 by Booke et al., have been reviewed and Applicants respectfully submit that the references cited do not anticipate or suggest the elements of Applicants' invention.

Summary and Conclusion

Based on the foregoing, it is respectfully submitted that the pending claims in the subject patent application are in condition for allowance and that the application may be passed to issuance.

The Examiner is urged to call the undersigned at the number listed below if, in the Examiner's opinion, such a phone conference would aid in furthering the prosecution of this application.

Respectfully submitted,
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